URAP 2017-2018 WORLD RANKING

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Introduction

As globalization drives rapid change in all aspects of research & development, international competition and collaboration have become high priority items on the agenda of most universities around the world. In this climate of competition and collaboration, ranking universities in terms of their performance has become a widely popular and debated research area. All universities need to know where they stand among other universities in the world in order to evaluate their current academic performance and to develop strategic plans that can help them strengthen and sustain their progress. In an effort to address this need, several ranking systems have been proposed since 2003, including ARWU (China), THE (United Kingdom), Leiden (The Netherlands), QS (United Kingdom), Webometrics (Spain), NTU (Taiwan), SciMago (Spain) and US News (USA), which rank universities worldwide based on various indicators. The use of bibliometric data obtained from widely known and credible information resources such as Web of Science, Scopus, and Google Scholar has contributed to the objectivity of these ranking systems. Nevertheless, most ranking systems cover up to top 800-1250 universities around the world, which mostly represents institutions located in developed countries. Universities from developing countries around the world also need to know where they stand among other institutions at global and national levels. This motivated us to develop a multi-criteria ranking system that is more comprehensive in coverage, so that more universities will have a chance to observe the state of their academic progress.

URAP World Ranking Indicators

URAP 2017-2018 World Ranking is based on 6 academic performance indicators. Since URAP is an academic performance based ranking, publications constitute the basis of the ranking methodology. Table 1 below summarizes the data source, the main objective and the duration of coverage for each ranking indicator.

Table 1. Overview of ranking indicators used in URAP 2017-2018 World Ranking

Indicator	Objective	Coverage	Source
Article (%21)	Current Scientific Productivity	2016	InCites™
Citation (%21)	Research Impact	2012-2016	InCites™
Total Document (%10)	Scientific Productivity	2012-2016	InCites™
Article Impact Total (%18)	Research Quality	2012-2016	InCites™
Citation Impact Total (%15)	Research Quality	2012-2016	InCites™
International Collaboration (%15)	International Acceptance	2012-2016	InCites™

A detailed description of each indicator is provided below:

Article: is a measure of current scientific productivity which includes articles published in journals that are listed in the first, second and third quartiles in terms of their Journal Impact Factor™ values within their respective scientific domain. Articles that include more than 1000 authors are excluded. The weight of this indicator on the overall ranking is %21.

Citation: is a measure of research impact and scored according to the total number of citations received in 2012-2016 for the articles published in 2012-2016 in journals that are listed within the first, second and third quartiles in terms of their Journal Impact Factor™. Articles that include more than 1000 authors are excluded. The effect of citation on the overall ranking is %21.

Total Document: is a measure of sustainability and continuity of scientific productivity of an institution, which covers all scholarly output of the institutions, including conference papers, reviews, letters, discussions, scripts in addition to journal articles published during 2012-2016. The total document counts are not subjected to any filtering. The weight of this indicator is %10.

Article Impact Total (AIT): is a measure of scientific productivity corrected by the institution's normalized CPP[1] with respect to the world CPP in 23 subject areas between 2012 and 2016. The ratio of the institution's CPP and the world CPP indicates whether the institution is performing above or below the world average in that field. This ratio is multiplied by the number of publications in that field and then summed across the 23 fields, as summarized by the following formula:

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[1] CPP stands for citation per publication

$$AIT = \sum_{i=1}^{23} \left(\frac{CPP_i}{CPP_{world}} \right) * Articles_i$$

This indicator aims to balance the institution's scientific productivity with the field normalized impact generated by those publications in each field. The weight of this indicator is %18.

Citation Impact Total (CIT): is a measure of research impact corrected by the institution's normalized CPP with respect to the world CPP in 23 subject areas between 2012 and 2016. The ratio of the institution's CPP and the world CPP indicates whether the institution is performing above or below the world average in that field. This ratio is multiplied by the number of citations in that field and then summed across the 23 fields. This indicator aims to balance the institution's scientific impact with the field normalized impact generated by the publications in each field, which is summarized by the following formula:

$$CIT = \sum_{i=1}^{23} \left(\frac{CPP_i}{CPP_{world}} \right) * Citations_i$$

The contribution of this indicator to the overall ranking is %15.

International Collaboration: is a measure of global acceptance of a university. International collaboration data, which is based on the total number of publications made in collaboration with foreign universities, is obtained from InCites for the years 2012-2016. The weight of this indicator is %15 in the overall ranking.

Data Collection & Processing

For the 2017-2018 URAP World Ranking, bibliometric data is obtained through the InCites research analytics service[2] provided by Clarivate Analytics, which provides an interface to the Web of Science database. The 23 subject areas used in the ranking are based on the discipline classification matrix developed by the Australian Research Council for journals indexed in Web of Science[3] [4].

The URAP ranking targets higher education institutions that offer undergraduate degree programs. Therefore, government organizations, science academies (e.g. the Chinese Academy of Sciences, National Academy of Sciences) medical schools and research institutes that only offer graduate degrees are not included in the URAP ranking. The raw data for 3000 eligible higher education institutions listed in InCites with the highest number of publications in 2016 were processed and the top 2500 of them were ranked.

The raw bibliometric data underlying the ranking indicators have highly skewed distributions. Therefore, the indicator values above and below the median are linearly scored in two separate groups. The Delphi system was

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[2] http://researchanalytics.thomsonreuters.com/incites

[3] http://www.arc.gov.au/pdf/ERA15/ERA%202015%20Discipline%20Matrix.pdf

[4] http://ipscience-help.thomsonreuters.com/inCites2Live/filterValuesGroup/researchAreaSchema/australiaFORLevel12.html

conducted with a group of experts to assign weighting scores to the indicators. A total score of 600 is distributed to each indicator based on the weights given in Table 1.

Discussion & Conclusion

The URAP ranking system's focus is on academic quality. The 2017-2018 ranking is extended to cover the top 2500 universities in the world, which approximately corresponds to 10% of all higher education institutions in the world. Existing global ranking systems include between 800-1250 universities. Therefore, URAP remains to be one of the most comprehensive university ranking systems in the world in terms of its coverage.

The URAP ranking is completely based on objective data obtained from reliable bibliometric sources. The system ranks the universities according to multiple indicators in an effort to balance the quality and the quantity of their overall contributions to science. For the first time in the 2017-2018 ranking, URAP employed a filter for raw article and citation counts based on Journal Impact Factor™ (JIF) quartiles. The scores for the article and citation indicators were computed based on publications that appeared in journals that are in the top 75th quartile in terms of their field adjusted JIF. For example, as shown in Figure 1 below, the top 20 institutions in this year's URAP ranking published between 50-70% of their 2016 articles in journals in the first quartile, whereas 75-90% of the articles are published in the first two quartiles. Figure 2 presents the raw article counts in each JIF quartile, where top universities publish between 5000-13000 articles in the first JIF quartile, whereas considerably lower article counts occur In the last JIF quartile. Therefore, quartile based filtering could be considered as a useful quality indicator.
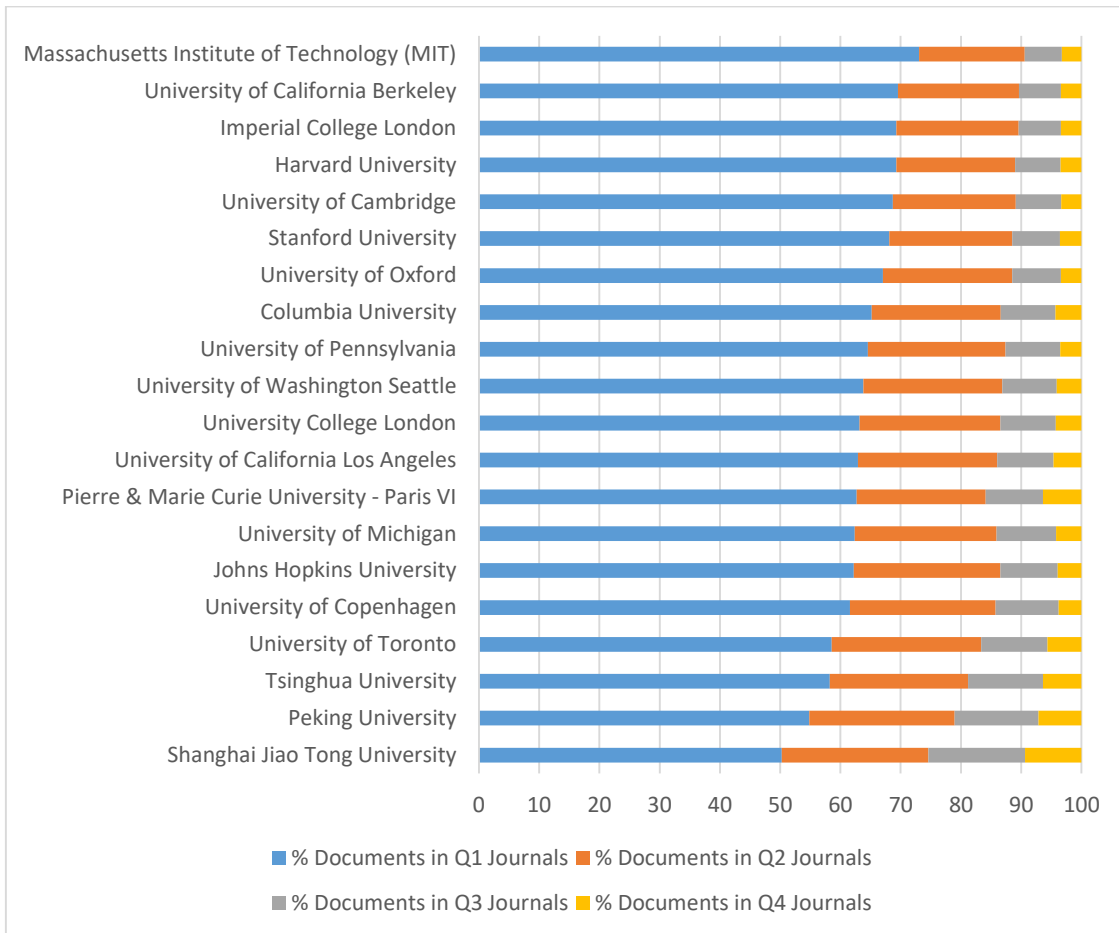
Figure 1. The percent of 2016 articles published in each JIF quartile for the top 20 universities in URAP.
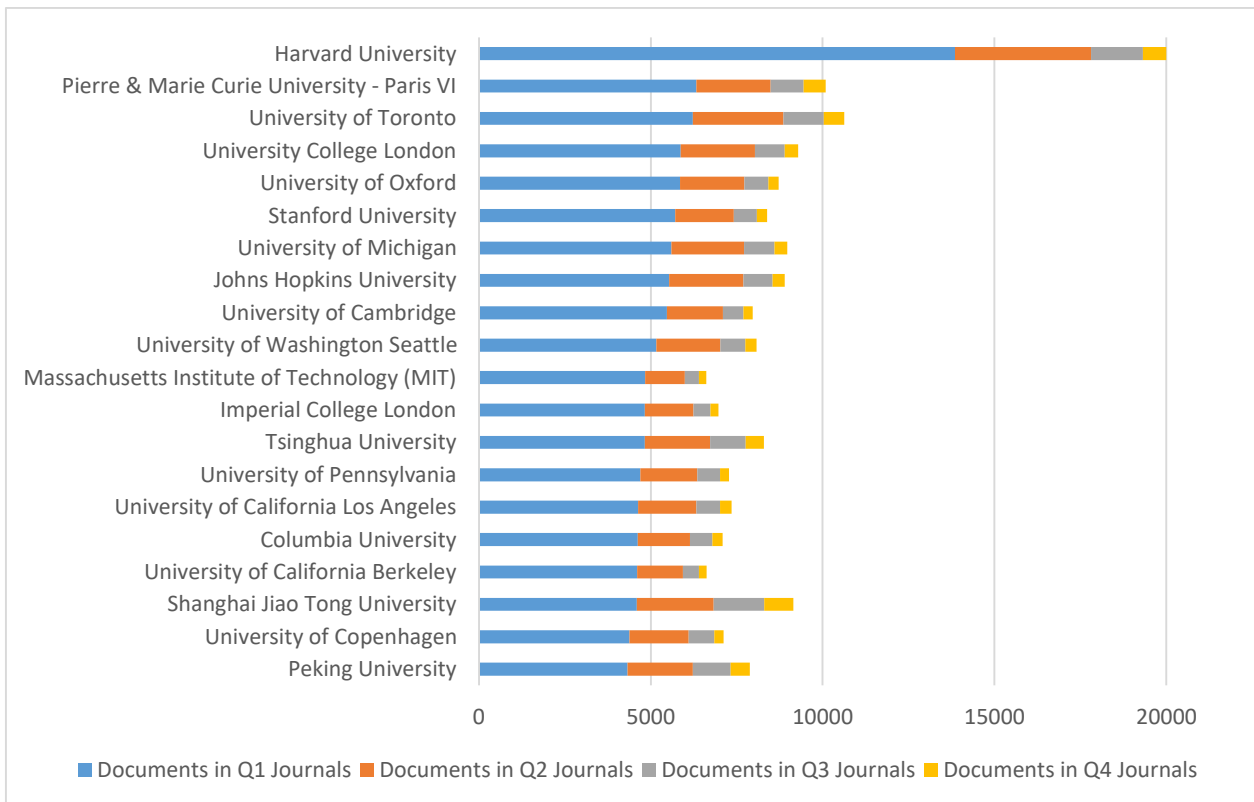

Figure 2. Number of articles published in each JIF quartile for the top 20 universities in URAP.

Indicators based on article and citation counts, which are also employed by other global rankings, are inevitably influenced by the size of the institutions and the variations in between publication trends across different scientific disciplines. The AIT and CIT indicators aim to minimize the influence of differences among publication trends across disciplines by providing subject level adjustments to article and citation counts. However, simply normalizing with respect to fields and countries may introduce additional problems. For instance, after field normalization, a publication in social sciences may carry up to two orders of magnitude higher weight in adjusted scores as compared to a publication in life sciences. For that reason, the URAP ranking includes both unadjusted and adjusted indicators in order to balance the total contributions of institutions to science together with field adjusted measures.

Starting with the 2015 URAP ranking, articles that are co-authored by very large groups of researchers have been excluded due to their impact on the scores of several institutions. Such articles may account for up to 90% of all citations of some institutions that take part in such studies, and thus have a significant impact on a ranking system such as URAP that covers a large number of institutions. To minimize the influence of such special cases, articles with more than 1000 co-authors are excluded from the article, citation and international collaboration indicators in this year's URAP World Ranking. Since such articles appear mainly in a few disciplines such as particle physics and life sciences, they were not excluded from AIT and CIT indicators. Moreover, total documents indicator is not subjected to any filtering. Therefore, such special articles are not entirely ignored by the URAP ranking system.

Overall, the goal of the URAP ranking system is not to label world universities as best or worst. Our intention is to help universities identify potential areas of progress with respect to specific academic performance indicators. Similar to other ranking systems, the URAP system is neither exhaustive nor definitive, and is open to new ideas and improvements. The current ranking system will be continuously upgraded based on our ongoing research and the constructive feedback of our colleagues.